

Amended
(c) determining at least one of a charge acceptance ability and a state of charge of the rechargeable lead-acid battery; and

Amended
(d) determining the overcharge current, the overcharge current exceeding the charge acceptance ability of the battery;

(e) determining an overcharge current increment to be added to the charging current to yield the overcharge current; and

(f) during step (b), supplying the overcharge current increment to the battery.

REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

Claims 1-20 are pending.

Applicants have amended claim 11 to eliminate unnecessary phraseology lacking antecedent basis. Accordingly, claim 11 has been broadened by this Amendment.

Claims 1-3 stand rejected under 35 U.S.C. §103 as being unpatentable over Schmitz in view of Kern and Heavey; and claims 11-13 stand rejected under 35 U.S.C. §103 as being unpatentable over Schmitz in view of Heavey. Applicants respectfully traverse these art grounds of rejection.

The Schmitz patent is directed to a battery charging system used in a hybrid electric vehicle. As such, the battery charging system of Schmitz is not a system for rapid battery charging. Accordingly, Applicants respectfully assert that one skilled in the art would not look to the art of Schmitz in developing a rapid battery charging system and methodology.

Furthermore, the battery charging system in Schmitz does not disclose or suggest applying an overcharge current during the charging of the battery as recited in claims 1 and 11 of the subject application. Specifically, Schmitz does not disclose or suggest "supplying the charging current and the overcharge current increment ... to deliver the overcharge current to the battery during charging," as recited in claim 1 or "during step (b), supplying the overcharge current increment to the battery," as recited in claim 11. Schmitz teaches quite the opposite.

On pages 2 and 4 of the Office Action, the Examiner asserts that column 5, lines 2-8 of Schmitz teaches the application of an overcharge current to the rechargeable battery in Schmitz. However, column 5, lines 4-8 recite "[t]he PLC 210 may switch the IGBT 330 off when the SOC of the battery array 30 reaches an upper control limit to stop the conversion of the AC voltage to DC voltage and prevent overcharging of the battery array 30." Contrary to the Examiner's assertions, the Schmitz patent teaches away from overcharging the battery. See also column 8, lines 60-67.

The Examiner also asserts that the Heavey patent teaches the application of an overcharge current and that it would have been obvious to have combined the teachings of Heavey with Schmitz. It is a well known tenet of patent law that it would not have been obvious to have combined two references when one of those references teaches away from the combination. In the present art grounds of rejection, the Examiner suggests combining an asserted battery overcharge teaching in the Heavey patent with the battery charging teaching in the Schmitz patent. However, as demonstrated above, Schmitz clearly teaches away from overcharging. Therefore, one skilled in the art would not have combined the teachings of Heavey with Schmitz.

Furthermore, Heavey does not disclose or suggest the overcharging performed in the claimed invention. The Heavey patent teaches a battery charging method and apparatus that attempts to identify the gassing point in a battery charge cycle. The gassing point is the point at which electrolysis of the water in the battery cell begins to occur. Heavey proposes using the gassing point to determine the charge state of the battery. In Heavey's method, once the gassing point is reached, the charger should be allowed to run for an additional four hours to finish the charging of the battery. In Heavey, the same charging current normally applied during the charging period is also applied for the additional four hours after the gassing point is reached. Heavey does not disclose or suggest supplying "the charging current and the overcharge

current increment" to the battery as recited in claims 1 and 11, and does not disclose or suggest supplying the resulting overcharge current to the battery during charging, as recited in claims 1 and 11.

Accordingly, Schmitz and Heavey are both deficient in teaching the overcharging recited in claims 1 and 11. The Examiner also relies upon a patent to Kern. Specifically, the Examiner asserts that Kern teaches a feedback process in controlling the recharging of a battery. The Kern patent relates to batteries incorporated into a lighting system. The battery charging system described in Kern is not for rapid battery charging, and as with Schmitz, would not have been considered by one skilled in the art in addressing concerns in a rapid battery charging system. Furthermore, like Schmitz, the Kern patent teaches away from overcharging a battery. As indicated in column 7, lines 37-41, charging is finished by applying a regulation voltage set point that prevents overcharging of the battery. Accordingly, like Schmitz and Heavey, the Kern patent fails to disclose or suggest the overcharging recited in claims 1 and 11.

Additionally, as with Schmitz, one skilled in the art would not have applied the teachings of the Kern patent in combination with art having an overcharge teaching.

For the reasons set forth above, claims 1 and 11 are not rendered obvious to one skilled in the art by Schmitz in view of Kern and/or Heavey.

Claims 2-3 and 12-13, dependent upon claims 1 and 11, are patentable for the reasons stated above with respect to claims 1 and 11 as well as on their own merits.

Applicants respectfully request that Examiner withdraw the art grounds of rejection.

Applicants note with appreciation the Examiner's indication that claims 4-10 and 14-20 would be allowable if rewritten in independent form. Because independent claims 1 and 11 are believed allowable, Applicants have not rewritten these claims at this time.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number listed below.

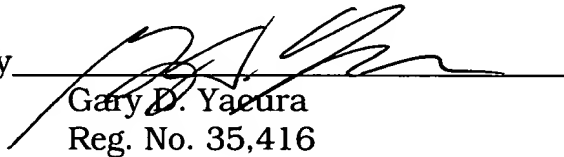
Pursuant to 37 C.F.R. 1.17 and 1.136(a), the Applicants respectfully petition for a one (1) month extension of time for filing a response in connection with the present application, and the required fee of \$110.00 is attached.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

HARNESS, DICKEY & PIERCE, PLC

By


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

11. (Amended) A method for recharging a rechargeable lead-acid battery, the method comprising:

- (a) generating a charging current for charging the battery;
- (b) supplying the charging current to the battery;
- (c) determining at least one of a charge acceptance ability and a state of charge of the rechargeable lead-acid battery;
- (d) determining the overcharge current, the overcharge current exceeding the charge acceptance ability of the battery;
- (e) determining an overcharge current increment to be added to the charging current to yield the overcharge current; and
- (f) during step (b), supplying the overcharge current increment to the battery[, the current control means being operable to deliver the overcharge current to the battery during charging].